

Claims

What is claimed is:

1. A method for supporting a multiple appearance directory number (MADN) group including packet- and circuit-switched terminals, the method comprising:
 - a) provisioning a common directory number for the MADN group including a circuit-switched terminal on a public switched telephone network (PSTN) and at least one packet-switched terminal on a packet-switched network;
 - b) providing centralized call signaling for the circuit-switched terminal and the at least one packet-switched terminal from the PSTN; and
 - c) providing PSTN services to the circuit-switched terminal and the at least one packet-switched terminal via the PSTN.
2. The method of claim 1 wherein the MADN group includes a plurality of packet-switched terminals sharing the common directory number and further comprising sending a status message from one of the plurality of packet-switched terminals or a supporting terminal proxy server to remaining ones of the plurality of packet-switched terminals upon occurrence of a MADN event.
3. The method of claim 2 wherein when originating a call from the one of the plurality of packet-switched terminals, the status message indicates that the one of the plurality of packet-switched terminals is originating the call.
4. The method of claim 2 wherein when an incoming call is directed to the MADN group and answered with the

one of the plurality of packet-switched terminals, the status message indicates that the one of the plurality of packet-switched terminals has answered the incoming call.

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5. The method of claim 2 wherein when the one of the plurality of packet-switched terminals disconnects from a call, which remains in progress after disconnect, the status message indicates that the one of the plurality of packet-switched terminals has disconnected from the call and that the call remains in progress.

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6. The method of claim 1 further comprising, when the at least one packet-switched terminal disconnects from a call:

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- a) sending a disconnect message directed to the PSTN from the at least one packet-switched terminal; and
- b) sending a release complete message in response to the disconnect message and directed to the at least one packet-switched terminal from the PSTN, the release complete message including feature information from the PSTN for use by the at least one packet-switched terminal.

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7. The method of claim 1 further comprising presenting the at least one packet-switched terminal on the packet-switched network as a PSTN terminal on a virtual telephony loop to the PSTN.

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8. The method of claim 7 further comprising associating the at least one packet-switched terminal with a

virtual loop identifier identifying the virtual telephony loop.

9. The method of claim 8 further comprising:

- a) presenting the PSTN to a gatekeeper on the packet-switched network as an endpoint on the packet-switched network;
- b) receiving a call signaling message on behalf of the at least one packet-switched terminal including the virtual loop identifier via the gatekeeper on the packet-switched network;
- c) identifying the virtual telephony loop based on the virtual loop identifier; and
- d) sending a corresponding call signaling message to the PSTN.

10. The method of claim 9 further comprising:

- a) receiving a call signaling message directed to the at least one packet-switched terminal from the PSTN via the virtual telephony loop; and
- b) sending a corresponding call signaling message to the gatekeeper for the at least one packet-switched terminal.

11. The method of claim 10 further comprising passing the virtual loop identifier from the PSTN to the gatekeeper with the call signaling message directed to the at least one packet-switched terminal.

12. The method of claim 10 further comprising tunneling information pertaining to at least one of call features or call indicators in certain of the call signaling messages sent between the PSTN and the at least one packet-switched terminal or a terminal

proxy server associated with the at least one packet-switched terminal via a gateway connecting the PSTN with the packet-switched network.

5 13. The method of claim 9 further comprising inserting information pertaining to PSTN features in certain of the call signaling messages sent to the at least one packet-switched terminal or a terminal proxy server associated with the at least one packet-switched terminal via the gatekeeper.

10 14. The method of claim 9 further comprising sending data associating the virtual loop identifier with a logical identifier for the at least one packet-switched terminal to the gatekeeper.

15 15. The method of claim 9 further comprising providing protocol conversion between the PSTN and the packet-switched network for call signaling.

20 16. The method of claim 9 further comprising providing conversion between packetized data in the packet-switched network and pulse code modulated data in the PSTN.

25 17. A call signaling system for supporting a multiple appearance directory number (MADN) group including packet- and circuit-switched terminals, the system comprising:

- 30 a) a circuit-switched interface supporting a circuit-switched terminal;
- b) a gateway supporting a packet-switched network with at least one packet-switched terminal;

- 5 c) a call signaling system associated with said circuit switched interface and said gateway and adapted to:
- 10 i) provision a common directory number for the MADN group including the circuit-switched terminal and the at least one packet-switched terminal on the packet-switched network;
 - 15 ii) provide centralized call signaling for the circuit-switched terminal and the at least one packet-switched terminal; and
 - iii) provide public switched telephone network (PSTN) services to the circuit-switched terminal and the at least one packet-switched terminal.
18. The system of claim 17 wherein the MADN group includes a plurality of packet-switched terminals sharing the common directory number, each one of the plurality of packet-switched terminals or a corresponding terminal proxy server configured to send a status message to remaining ones of the plurality of packet-switched terminals upon occurrence of a MADN event.
- 25 19. The system of claim 18 wherein when originating a call from the one of the plurality of packet-switched terminals, the status message indicates that the one of the plurality of packet-switched terminals is originating the call.
- 30 20. The system of claim 18 wherein when an incoming call is directed to the MADN group and answered with the one of the plurality of packet-switched terminals,

the status message indicates that the one of the plurality of packet-switched terminals has answered the incoming call.

- 5 21. The system of claim 18 wherein when the one of the plurality of packet-switched terminals disconnects from a call, which remains in progress after disconnect, the status message indicates that the one of the plurality of packet-switched terminals has disconnected from the call and that the call remains in progress.
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22. The system of claim 17 wherein the call signaling system is further adapted to, when the at least one packet-switched terminal disconnects from a call:
- 15 a) receive a disconnect message from the at least one packet-switched terminal; and
- b) send a release complete message in response to the disconnect message and directed to the at least one packet-switched terminal, the release complete message including feature information for use by the at least one packet-switched terminal.
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23. The system of claim 17 further comprising a gateway adapted to cooperate with said call signaling system to present the at least one packet-switched terminal on the packet-switched network as a PSTN terminal on a virtual telephony loop to the PSTN.
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24. The system of claim 23 wherein said call signaling system is further adapted to associate the at least one packet-switched terminal with a virtual loop identifier identifying the virtual telephony loop.
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25. The system of claim 24 further comprising a gatekeeper on the packet-switched network and adapted to interact with said gateway and the at least one packet-switched terminal or a terminal proxy server therefor wherein said gateway is configured to:
- a) present the PSTN to said gatekeeper on the packet-switched network as an endpoint on the packet-switched network;
 - b) receive a call signaling message including the virtual loop identifier on behalf of the at least one packet-switched terminal;
 - c) identify the virtual telephony loop based on the virtual loop identifier; and
 - d) send a corresponding call signaling message to the call signaling system.
26. The method of claim 25 wherein the call signaling message includes an integrated services digital network (ISDN) call signaling message and the endpoint is an H.323 endpoint.
27. The method of claim 17 wherein the circuit-switched interface is an integrated service digital network (ISDN) interface and the gateway emulates an ISDN interface wherein the packet-switched terminal appears to the call signaling system as a circuit-switched terminal on an integrated services digital network.
28. A system for supporting a multiple appearance directory number (MADN) group including packet- and circuit-switched terminals, the method comprising:

- 5 a) means for provisioning a common directory number for the MADN group including a circuit-switched terminal on a public switched telephone network (PSTN) and at least one packet-switched terminal on a packet-switched network;
- b) means for providing centralized call signaling for the circuit-switched terminal and the at least one packet-switched terminal from the PSTN; and
- 10 c) means for providing PSTN services to the circuit-switched terminal and the at least one packet-switched terminal via the PSTN.

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